```
=> d que l35
L2            90 SEA FILE=REGISTRY ABB=ON  PLU=ON  C7H8N2O5S/MF
L3            88 SEA FILE=REGISTRY ABB=ON  PLU=ON  L2 AND 1/NR
L4             2 SEA FILE=REGISTRY ABB=ON  PLU=ON  L3 AND DIAMI?
L11           17 SEA FILE=HCAPLUS ABB=ON  PLU=ON  CARBOXYPHENYLPHOSPHONIC?
L12            1 SEA FILE=REGISTRY ABB=ON  PLU=ON  618-21-3/RN
L15            6 SEA FILE=REGISTRY ABB=ON  PLU=ON  PHOSPHONOBENZOIC
                 ACID?/CNS
L17       103447 SEA FILE=REGISTRY ABB=ON  PLU=ON  BENZOIC ACID?/CNS AND
                 SULFO?/CNS
L18          638 SEA FILE=REGISTRY ABB=ON  PLU=ON  L17 AND DIAMIN?/CNS
L19            2 SEA FILE=REGISTRY ABB=ON  PLU=ON  L18 AND 1/NR
L20           28 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L12
L21            1 SEA FILE=REGISTRY ABB=ON  PLU=ON  L15 AND 1/NR
L22           28 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L21
L23           28 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L20 OR L22
L24            1 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L19 OR L4
L30            9 SEA FILE=HCAPLUS ABB=ON  PLU=ON  PHENYLENEDIAMINE?(3A)SULFO
                 ?(5A)CARBOXY?
L31           43 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L23 OR L24 OR L30 OR L11
L32            2 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L31 AND (PROTON CONDUCT?
                 OR ELECTROLYT?)
L33            1 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L31 AND ELECTRO?/SC,SX
L34            3 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L32 OR L33
L35            4 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L24 OR L34


=> d que l39
L36            0 SEA FILE=WPIX ABB=ON  PLU=ON  PHOSPHONOBENZOIC ACID?
L37            1 SEA FILE=WPIX ABB=ON  PLU=ON  CARBOXYPHENYLPHOSPHONIC?
L38            1 SEA FILE=WPIX ABB=ON  PLU=ON  CARBOXYPHENYLSULFONIC ACID?
L39            2 SEA FILE=WPIX ABB=ON  PLU=ON  (L36 OR L37 OR L38)


=> d que l42
L40            1 SEA FILE=COMPENDEX ABB=ON  PLU=ON  CARBOXYPHENYLPHOSPHONIC?

L41            0 SEA FILE=COMPENDEX ABB=ON  PLU=ON  CARBOXYPHENYLSULFONIC
                 ACID?
L42            1 SEA FILE=COMPENDEX ABB=ON  PLU=ON  L40 OR L41


=> d que l43
L40            1 SEA FILE=COMPENDEX ABB=ON  PLU=ON  CARBOXYPHENYLPHOSPHONIC?

L41            0 SEA FILE=COMPENDEX ABB=ON  PLU=ON  CARBOXYPHENYLSULFONIC
                 ACID?
L43            0 SEA FILE=PASCAL ABB=ON  PLU=ON  L40 OR L41


=> d que l44
L40            1 SEA FILE=COMPENDEX ABB=ON  PLU=ON  CARBOXYPHENYLPHOSPHONIC?

L41            0 SEA FILE=COMPENDEX ABB=ON  PLU=ON  CARBOXYPHENYLSULFONIC
                 ACID?
L44            1 SEA FILE=JAPIO ABB=ON  PLU=ON  L40 OR L41


=> dup rem l35 l39 l42 l43 l44
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L43 HAS NO ANSWERS
FILE 'HCAPLUS' ENTERED AT 08:18:10 ON 23 FEB 2008
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
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FILE 'COMPENDEX' ENTERED AT 08:18:10 ON 23 FEB 2008
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FILE 'JAPIO' ENTERED AT 08:18:10 ON 23 FEB 2008
COPYRIGHT (C) 2008 Japanese Patent Office (JPO)- JAPIO
PROCESSING COMPLETED FOR L35
PROCESSING COMPLETED FOR L39
PROCESSING COMPLETED FOR L42
PROCESSING COMPLETED FOR L43
PROCESSING COMPLETED FOR L44
L45           8 DUP REM L35 L39 L42 L43 L44 (0 DUPLICATES REMOVED)
                ANSWERS '1-4' FROM FILE HCAPLUS
                ANSWERS '5-6' FROM FILE WPIX
                ANSWER '7' FROM FILE COMPENDEX
                ANSWER '8' FROM FILE JAPIO

=> d 1-8 ibib ed abs hitstr hitind

L45  ANSWER 1 OF 8  HCAPLUS  COPYRIGHT 2008 ACS on STN
ACCESSION NUMBER:         2002:384342  HCAPLUS  Full-text
DOCUMENT NUMBER:          136:386895
TITLE:                    Ion-conducting phosphonic acid-containing
                          polyazoles
INVENTOR(S):              Nakao, Junko; Sakaguchi, Yoshimitsu; Kitamura,
                          Kota; Takase, Satoshi; Hamamoto, Shiro; Tatemori,
                          Hiroshi
PATENT ASSIGNEE(S):       Toyobo Co., Ltd., Japan
SOURCE:                   Jpn. Kokai Tokkyo Koho, 8 pp.
                          CODEN: JKXXAF
DOCUMENT TYPE:            Patent
LANGUAGE:                 Japanese
FAMILY ACC. NUM. COUNT:   1
PATENT INFORMATION:

     PATENT NO.           KIND   DATE        APPLICATION NO.         DATE
     ---------------      ----   --------    --------------------    --------
     JP 2002146016         A     20020522    JP 2000-348325          20001115
PRIORITY APPLN. INFO.:                       JP 2000-348325          20001115

ED   Entered STN:  23 May 2002
AB    Polyazoles have 3% weight loss temperature >400° determined by TGA based on
      the weight at 200° during heating and average mol. weight 1000-1,000,000.
      Thus, 3,5-dicarboxyphenylphosphonic acid-3,3',4,4'-tetraaminodiphenyl sulfone
      copolymer was prepared
IC   ICM  C08G073-06
     ICS  C08J005-22; H01B001-06; H01M008-02; C08L079-04
CC   37-3 (Plastics Manufacture and Processing)
```
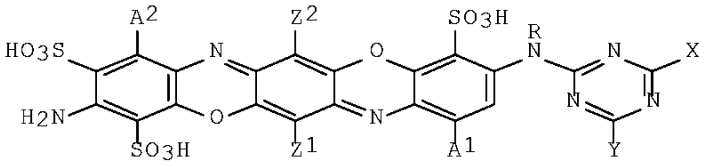

Section cross-reference(s): **52**
ST polyazole ion conductor heat resistance;
carboxyphenylphosphonic acid aminodiphenyl sulfone copolymer

L45 ANSWER 2 OF 8 HCAPLUS COPYRIGHT 2008 ACS on STN
ACCESSION NUMBER: 1997:547413 HCAPLUS Full-text
DOCUMENT NUMBER: 127:150206
TITLE: Asymmetrical triphenodioxazine reactive dyes and their use
INVENTOR(S): Inoue, Masato; Hada, Junya; Araki, Toshiyuki
PATENT ASSIGNEE(S): Sumitomo Chemical Co., Ltd., Japan
SOURCE: Ger. Offen., 26 pp.
CODEN: GWXXBX
DOCUMENT TYPE: Patent
LANGUAGE: German
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 19702537	A1	19970731	DE 1997-19702537	19970124
JP 09202788	A	19970805	JP 1996-10425	19960124
JP 3317120	B2	20020826		
US 5837869	A	19981117	US 1997-788816	19970123
CH 691971	A5	20011215	CH 1997-156	19970123
GB 2309462	A	19970730	GB 1997-1495	19970124
GB 2309462	B	19980429		
US 5977358	A	19991102	US 1998-115593	19980715
PRIORITY APPLN. INFO.:			JP 1996-10425 A	19960124

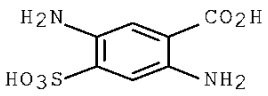
OTHER SOURCE(S): MARPAT 127:150206
ED Entered STN: 28 Aug 1997
GI



I

AB The dyes (I; A1 = C1-4-alkyl, C1-4-alkoxy, Br, Cl, CO2H; A2 = H, C1-4-alkyl, C1-4-alkoxy, Br, Cl, CO2H; R = H, optionally substituted lower alkyl; X, Y = halogen, optionally substituted lower alkoxy, amino optionally containing a vinyl sulfone or potential vinyl sulfone group; Z1, Z2 = H, Br, Cl, C1-4-alkyl, C1-4-alkoxy, PhO) are suitable for dyeing or printing of fibrous materials. I have good Cl resistance. Thus, 1,4-phenylenediamine-2,6-disulfonic acid was condensed with 1,4-phenylenediamine-2-methoxy-5-sulfonic acid and chloranil to give a dianilide which was cyclocondensed to provide an asym. triphenodioxazine. This dye was then treated with cyanuric chloride, taurine, and 3-(β-sulfatoethylsulfonyl)aniline to yield a reactive dye (λmax 595 nm), fast reddish blue on cotton.
IT **193205-93-5**, 1,4-Phenylenediamine-2-carboxy-5-sulfonic acid
(starting material; asym. triphenodioxazine reactive dye preparation and

application to cotton)
RN 193205-93-5 HCAPLUS
CN Benzoic acid, 2,5-diamino-4-sulfo- (CA INDEX NAME)



IC ICM C09B062-04
ICS C09B019-02; D06P001-382
ICA C07D498-04; C07D251-26
CC 41-5 (Dyes, Organic Pigments, Fluorescent Brighteners, and Photographic Sensitizers)
Section cross-reference(s): 40
IT 107-35-7, Taurine 108-77-0, Cyanuric chloride 118-75-2, Chloranil, reactions 488-48-2, Bromanil 675-14-9, Cyanuric fluoride 2494-88-4, 3-(β-Sulfatoethylsulfonyl)aniline 6409-48-9, 1,4-Phenylenediamine-2,6-disulfonic acid 6409-55-8, 1,4-Phenylenediamine-2-methoxy-5-sulfonic acid 100959-37-3, 1,4-Phenylenediamine-2-methyl-5-sulfonic acid **193205-93-5**, 1,4-Phenylenediamine-2-carboxy-5-sulfonic acid 193205-94-6, 1,4-Phenylenediamine-2-chloro-5-sulfonic acid 193205-95-7, 1,4-Phenylenediamine-3-methyl-2,6-disulfonic acid
(starting material; asym. triphenodioxazine reactive dye preparation and application to cotton)

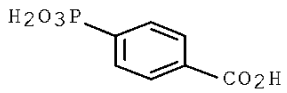
L45 ANSWER 3 OF 8 HCAPLUS COPYRIGHT 2008 ACS on STN
ACCESSION NUMBER: 1955:42715 HCAPLUS Full-text
DOCUMENT NUMBER: 49:42715
ORIGINAL REFERENCE NO.: 49:8162a-f
TITLE: The electrical effect of the diethoxyphosphinyl group
AUTHOR(S): Freedman, Leon D.; Jaffe, H. H.
CORPORATE SOURCE: Univ. of North Carolina, Chapel Hill
SOURCE: Journal of the American Chemical Society (1955), 77, 920-1
CODEN: JACSAT; ISSN: 0002-7863
DOCUMENT TYPE: Journal
LANGUAGE: Unavailable
ED Entered STN: 22 Apr 2001
AB The m- and p-isomers of the compds. YC6H4P(O)(OEt)2 (I), where Y = CO2H, OH, and NH2, have been prepared, and their acid (or base) dissociation consts. have been determined and the σ values have been calculated (Y, pKa, and σ given): p-CO2H (II), 3.60, 0.60; p-NH2 (III).H+, 2.22, 0.84; p-OH (IV), 8.28, 0.73; m-CO2H (V), 3.65, 0.55; m-NH2 (VI).H+, 3.09, 0.53; m-OH (VII), 8.66, 0.56. V (11.4 g.) and 37 g. PCl6 heated gently, the resulting POCl3 and excess PCl5 distilled off, the residue treated with 15 cc. CCl4, the solution treated with 37 cc. absolute EtOH, the CCl4 and excess EtOH distilled off, and the residue distilled gave 79% I with Y = m-EtO2C (VIII), b0.3 137-49°. In the same manner was prepared the p-isomer of VIII, 80%, b0.3 143-7°. By the same method except that 2.1 moles PCl5 was used/mole phosphonic acid were prepared I with Y = m-NO2 (IX), 79%, b0.2 133-7°; and I with Y = p-NO2 (X), 88%, b0.3 139-44°. VIII (5.77 g.) in 40 cc. EtOH and 40.9 cc. 0.494N NaOH kept about 24 hrs. at room temperature, the solution concentrated in vacuo to about 30 cc. and filtered, the filtrate acidified to Congo red and extracted

with C6H6, and the extract filtered through paper and evaporated gave 92% V, m. 85-6°. Similarly was prepared II, m. 105-7°, in 93% yield. IX (15.2 g.) in 100 cc. absolute EtOH hydrogenated at 40 lbs. pressure over Raney Ni, the mixture filtered, the filtrate evaporated in vacuo, the residual sirup kept at -25° overnight, and the solid dissolved in warm C6H6, treated with C, and evaporated to dryness gave 95% III, m. 47-50°. x reduced similarly, the mixture filtered and diluted with 200 cc. H2O, the solution cooled to -25°, and the crystals dried in vacuo at 100° gave 76% VI, m. 115-19°. III (8.17 g.) in 35 cc. H2O and 10 cc. concentrated HCl diazotized at 0° with EtONO, the solution warmed until the N evolution ceased, the mixture extracted with C6H6, the extract reextd. with 10% aqueous Na2CO3, the aqueous alkaline extract acidified to Congo red and extracted with C6H6, the extract filtered and evaporated, and the oily residue crystallized at -25° gave 15% IV, m. 67-9°. VII, m. 93-4°, was prepared similarly in 47% yield.

IT **618-21-3P**, Benzoic acid, p-phosphono-, ethyl esters
(preparation of)

RN 618-21-3 HCAPLUS

CN Benzoic acid, 4-phosphono- (CA INDEX NAME)



CC 10 (Organic Chemistry)

IT Ionization
(**electrolytic**, of phenylphosphonic acid derivs.)

IT **618-21-3P**, Benzoic acid, p-phosphono-, ethyl esters
2175-86-2P, Phosphonic acid, [p-nitrophenyl]-, diethyl esters
5337-19-9P, Phosphonic acid, [m-nitrophenyl]-, diethyl esters
5732-17-2P, Benzoic acid, 2,4,6-triphenyl- 5962-37-8P, Propionic acid, 3,3'-mercuridi- 33733-31-2P, Phosphonic acid, [m-hydroxyphenyl]-, diethyl esters 33795-18-5P, Phosphonic acid, [p-hydroxyphenyl]-, diethyl esters 42822-57-1P, Phosphonic acid, [p-aminophenyl]-, diethyl ester 89277-85-0P, Phosphonic acid, [m-aminophenyl]-, diethyl ester
(preparation of)

L45 ANSWER 4 OF 8 HCAPLUS COPYRIGHT 2008 ACS on STN
ACCESSION NUMBER: 1953:46750 HCAPLUS Full-text
DOCUMENT NUMBER: 47:46750
ORIGINAL REFERENCE NO.: 47:7866f-h
TITLE: The acid dissociation constants of aromatic phosphonic acids. I. Meta- and para-substituted compounds
AUTHOR(S): Jaffe, H. H.; Freedman, Leon D.; Doak, G. O.
CORPORATE SOURCE: Univ. N. Carolina, Chapel Hill
SOURCE: Journal of the American Chemical Society (1953), 75, 2209-11
CODEN: JACSAT; ISSN: 0002-7863
DOCUMENT TYPE: Journal
LANGUAGE: Unavailable
ED Entered STN: 22 Apr 2001

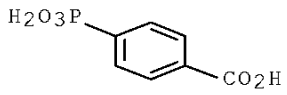
AB The acid dissociation consts. were determined by potentiometric titration in H2O and in 50% EtOH for 25 compds. or ions of the formula RC6H4PO3H2, where R is: m-(NH2Me) +, m-(NH2Et)+, p-NO2, m-NO2, p-SO2NH2, p-COOH, m-Br, m-Cl, m-COOH, p-Br, p-Cl, p-COO-, m-OH, m-COO-, H, p-SEt, p-NHAc, m-NH2, m-NHEt, m-

NHMe, m-NH(CH2)3Me, m-NHNH2, 3,4-CH2O2, p-Me, p-OH, p-OEt, p-NH2, p-NHNH2, and p-NHMe. The data show that Hammett's equation applies and that the derived reaction consts. are close to unity. The values of the reaction consts. depend on the polarizabilities of the central atoms of the acid functions. The structures of amino-phosphonic acids are discussed.

IT **618-21-3**, Benzoic acid, p-phosphono-
(and ions of, ionization of)

RN 618-21-3 HCAPLUS

CN Benzoic acid, 4-phosphono- (CA INDEX NAME)



CC 2 (General and Physical Chemistry)

IT Ionization
(**electrolytic**, of phosphonic acid m- and p- derivs.)

IT **618-21-3**, Benzoic acid, p-phosphono- 14899-31-1, Benzoic acid, m-phosphono-
(and ions of, ionization of)

=> d 5-6 full

L45 ANSWER 5 OF 8 WPIX COPYRIGHT 2008 THE THOMSON CORP on STN

AN 2004-357915 [34] WPIX Full-text

DNC C2004-135781 [34]

DNN N2004-286271 [34]

TI Polymer electrolyte membrane for use, e.g. in fuel cells, obtained by heating a mixture of phosphonated aromatic polyazole monomers in polyphosphoric acid and then processing to form a self-supporting membrane

DC A26; A85; L03; X16

IN BENICEWICZ B; CALUNDANN G; CHOE E W; KIEFER J; SANSONE M; UENSAL O

PA (CELA-C) CELANESE VENTURES GMBH; (PEME-N) PEMEAS GMBH; (BENI-I) BENICEWICZ B; (CALU-I) CALUNDANN G; (CHOE-I) CHOE E W; (KIEF-I) KIEFER J; (SANS-I) SANSONE M; (UENS-I) UENSAL O

CYC 34

PI DE 10246459 A1 20040415 (200434)* DE 29[0]
WO 2004033079 A2 20040422 (200434) DE
EP 1554032 A2 20050720 (200547) DE
US 20060008690 A1 20060112 (200605) EN
JP 2006501991 W 20060119 (200607) JA 48
CN 1726071 A 20060125 (200639) ZH
KR 2005073477 A 20050713 (200643) KO

ADT DE 10246459 A1 DE 2002-10246459 20021004; CN 1726071 A CN 2003-80100918 20031002; EP 1554032 A2 EP 2003-775169 20031002; WO 2004033079 A2 WO 2003-EP10906 20031002; EP 1554032 A2 WO 2003-EP10906 20031002; US 20060008690 A1 WO 2003-EP10906 20031002; JP 2006501991 W WO 2003-EP10906 20031002; JP 2006501991 W JP 2004-542403 20031002; US 20060008690 A1 US 2005-530002 20050822; KR 2005073477 A WO 2003-EP10906 20031002; KR 2005073477 A KR 2005-705878 20050404

FDT EP 1554032 A2 Based on WO 2004033079 A; JP 2006501991 W Based on WO 2004033079 A; KR 2005073477 A Based on WO 2004033079 A

PRAI DE 2002-10246459 20021004

IC ICM C08J005-22

IPCI B01D0061-42 [I,C]; B01D0061-44 [I,A]; B01D0069-00 [I,C]; B01D0069-12 [I,A]; B01D0071-00 [I,C]; B01D0071-00 [I,C]; B01D0071-62 [I,A]; B01D0071-62 [I,A]; B01D0071-82 [I,A]; C08G0073-00 [I,C]; C08G0073-06 [I,A]; C08J0005-20 [I,C]; C08J0005-22 [I,A]; H01B0001-06 [I,A]; H01M0004-86 [I,A]; H01M0004-86 [I,C]; H01M0008-02 [I,A]; H01M0008-10 [I,A]; H01M0008-10 [I,C]

IPCR B01D0071-00 [I,C]; B01D0071-62 [I,A]; B01D0071-82 [I,A]; C08G0073-00 [I,C]; C08G0073-18 [I,A]; H01M0008-10 [I,A]; H01M0008-10 [I,C]

EPC B01D0071-62; B01D0071-82; C08G0073-18; H01M0008-10E2

NCL NCLM 429/033.000

NCLS 429/042.000; 429/314.000; 521/027.000

AB DE 10246459 A1 UPAB: 20060121

NOVELTY - Proton-conducting, polyazole-based polymer membranes are obtained by heating a mixture of (hetero)aromatic monomers (tetra-amino compounds and polycarboxylic acids, or diamino-carboxylic acids, at least some of which have phosphonic acid groups) in polyphosphoric acid at up to 350degreesC and then processing to form a self-supporting membrane.

DETAILED DESCRIPTION - A proton-conducting polymer membrane containing polyazoles with phosphonic acid groups, obtained by (A) mixing (hetero)aromatic tetra-amino compounds with (hetero)aromatic carboxylic acids containing at least two acid groups (or their derivatives), where at least part of the amino and/or acid compounds have at least one phosphonic acid group, or mixing (hetero)aromatic diaminocarboxylic acids (at least part of which contains phosphonic acid groups) in polyphosphoric acid (PPA) to form a solution and/or dispersion, (B) heating at up to 350degreesC under inert gas to form polyazoles, (C) coating the mixture from (A) and/or (B) onto a support and (D) treating the membrane thus formed until it is self-supporting.

INDEPENDENT CLAIMS are also included for

(1) electrodes with a conductive polymer coating, obtained by the above process but using an electrode as the support in step (C)

(2) membrane-electrode units comprising electrode(s) and membrane(s) as above

(3) fuel cells containing such membrane-electrode units

USE - In membrane-electrode units, especially for use in fuel cells. Other applications include electrolysis, condensers and battery systems.

ADVANTAGE - Polymer-electrolyte membranes with a high level of efficiency (especially high conductivity over a wide temperature range, even without added moisture), enabling the production of fuel cells which can be operated at low temperature (e.g. 80degreesC) without a considerable reduction in service life. These membranes are produced by a simple, low-cost method, without using expensive solvents such as dimethylacetamide which are difficult to remove.

TECH ORGANIC CHEMISTRY - Preferred Starting Materials: Phosphonated tetra-amines of formula (H2N)4ArYpZr (A) and acids of formula (XOC)2ArYpZr (B), and possibly also corresponding compounds with sulfonic acid groups, in which

Ar = a (hetero)aromatic group;

Y = a single bond or a group with 1-20 carbon atoms;

p, r = 1-4;

Z = groups of formula -PO3H2 or -C(R1)(PO3H2)2 and/or groups of formula -SO3H or -C(R1)(SO3H)2;

X = halogen or OR2;

R1, R2 = H or a 1-20C group

. Preferred compounds comprise (a) 3,3,4,4-tetra-amino-biphenyl, 2,3,5,6-tetra-amino-pyridine and/or 1,2,4,5-tetra-aminobenzene; (b) (hetero)aromatic di-acids or their derivatives, e.g. phthalic, isophthalic, terephthalic acids and various substituted derivatives thereof, diphenic acid, naphthalenedicarboxylic acids, benzophenone-4,4-dicarboxylic acid, biphenyl-4,4-dicarboxylic acid, 4-carboxycinnamic acid etc. (35 di-acids listed); (c) 2,3-diamino-5 -

carboxyphenylphosphonic acid and 2,3- or 3,4-diamino-6-carboxy-phenylphosphonic acid; (d) sulfonic acids corresponding to (c); (e) tri- or tetra-acids and their derivatives, especially e.g. trimesic, trimellitic, benzene-1,2,4,5-tetracarboxylic or naphthalene-1,2,4,5-tetracarboxylic acid etc. (14 acids listed), in amounts of 0-30 (preferably 0.5-10) mol% based on the amount of di-acid; (f) heteroaromatic acids, preferably pyridine-2,5-, -3,5-, -2,6- or -2,4-dicarboxylic acid, similar derivatives of pyrazole, pyrimidine, pyrazine or benzimidazole, pyridine-2,4,6-tricarboxylic acid, etc. (10 acids listed); (g) diaminobenzoic acids and/or their mono- and di-hydrochlorides.

POLYMERS - Preferred Method: The solution prepared in step (A) and/or (B) may also contain dispersed and/or suspended polymer. Step (B) involves heating after forming a sheet of material as in (C). Step (D) involves treatment for 10 seconds to 300 hours at 0-150degreesC in presence of moisture, and the membrane obtained after (D) is crosslinked by the action of oxygen. A layer with a thickness of 20-4000 microns is formed in step (C) and the membrane formed in (D) has a thickness of 15-3000 microns. Electrodes made by this method have a conductive polymer coating with a thickness of 2-3000 microns.

FS CPI; EPI

MC CPI: A05-J02; A12-E06; L03-E04A2
EPI: X16-C01C; X16-E06A; X16-F02; X16-J01A

L45 ANSWER 6 OF 8 WPIX COPYRIGHT 2008 THE THOMSON CORP on STN

AN 2004-357912 [34] WPIX Full-text

DNC C2004-135780 [34]

DNN N2004-286268 [34]

TI Polymer electrolyte membrane for use, e.g. in fuel cells, manufactured by heating a mixture of sulfonated aromatic polyazole monomers in polyphosphoric acid and then processing to form a self-supporting membrane

DC A26; A85; L03; X16

IN BENICEWICZ B; CALUNDANN G; CHOE E W; KIEFER J; SANSONE M; UENSAL O; BENICEWIEZ B

PA (CELA-C) CELANESE VENTURES GMBH; (PEME-N) PEMEAS GMBH; (BENI-I) BENICEWIEZ B; (CALU-I) CALUNDANN G; (CHOE-I) CHOE E W; (KIEF-I) KIEFER J; (SANS-I) SANSONE M; (UENS-I) UENSAL O

CYC 34

PI DE 10246373 A1 20040415 (200434)* DE 25[0]
WO 2004034499 A2 20040422 (200434) DE
EP 1552574 A2 20050713 (200546) DE
JP 2006502265 W 20060119 (200607) JA 40
CN 1720632 A 20060111 (200639) ZH
KR 2005073475 A 20050713 (200643) KO
US 20060183012 A1 20060817 (200655) EN

ADT DE 10246373 A1 DE 2002-10246373 20021004; CN 1720632 A CN 2003-80100919 20031002; EP 1552574 A2 EP 2003-748106 20031002; WO 2004034499 A2 WO 2003-EP10904 20031002; EP 1552574 A2 WO 2003-EP10904 20031002; JP 2006502265 W WO 2003-EP10904 20031002; KR 2005073475 A WO 2003-EP10904 20031002; JP 2006502265 W JP 2004-542401 20031002; KR 2005073475 A KR 2005-705875 20050404; US 20060183012 A1 WO 2003-EP10904 20031002; US 20060183012 A1 US 2005-529993 20050412

FDT EP 1552574 A2 Based on WO 2004034499 A; JP 2006502265 W Based on WO 2004034499 A; KR 2005073475 A Based on WO 2004034499 A

PRAI DE 2002-10246373 20021004

IC ICM C08J005-22

IPCI C08G0073-00 [I,C]; C08G0073-06 [I,A]; C08J0005-20 [I,C]; C08J0005-20 [I,C]; C08J0005-22 [I,A]; C08J0005-22 [I,A]; H01B0001-06 [I,A]; H01M0004-86 [I,A]; H01M0004-86 [I,C]; H01M0008-02 [I,A]; H01M0008-10

[I,A]; H01M0008-10 [I,A]; H01M0008-10 [I,C]; H01M0008-10 [I,C]
IPCR B01D0071-00 [I,C]; B01D0071-62 [I,A]; B01D0071-82 [I,A]; C08G0073-00 [I,C]; C08G0073-18 [I,A]; H01M0008-10 [I,A]; H01M0008-10 [I,C]
EPC B01D0071-62; B01D0071-82; C08G0073-18; C08J0005-22B2D; H01M0008-10E2
AB DE 10246373 A1 UPAB: 20060121

NOVELTY - Proton-conducting, polyazole-based polymer membranes are obtained by heating a mixture of (hetero)aromatic monomers (tetra-amino compounds and polycarboxylic acids, or diamino-carboxylic acids, at least some of which have sulfonic acid groups) in polyphosphoric acid at up to 350degreesC and then processing to form a self-supporting membrane.

DETAILED DESCRIPTION - A proton-conducting polymer membrane containing polyazoles with sulfonic acid groups, obtained by (A) mixing (hetero)aromatic tetra-amino compounds with (hetero)aromatic carboxylic acids containing at least two acid groups (or their derivatives), where at least part of the amino and/or acid compounds have at least one sulfonic acid group, or mixing (hetero)aromatic diaminocarboxylic acids (at least part of which contains sulfonic acid groups) in polyphosphoric acid (PPA) to form a solution and/or dispersion, (B) heating at up to 350degreesC under inert gas to form polyazoles, (C) coating the mixture from (B) onto a support and (D) treating the membrane thus formed until it is self-supporting. INDEPENDENT CLAIMS are also included for

(1) electrodes with a conductive polymer coating, obtained by the above process but using an electrode as the support in step (C)

(2) membrane-electrode units comprising electrode(s) and membrane(s) as above

(3) fuel cells containing such membrane-electrode units

USE - In membrane-electrode units, especially for use in fuel cells. Other applications include electrolysis, condensers and battery systems.

ADVANTAGE - Polymer-electrolyte membranes with a high level of efficiency (especially high conductivity over a wide temperature range, especially at high temperature without added moisture), enabling the production of fuel cells which can be operated at low temperature (e.g. 80degreesC) without a considerable reduction in service life. These membranes are produced by a simple, low-cost method, without using expensive solvents such as dimethylacetamide which are difficult to remove.

TECH ORGANIC CHEMISTRY - Preferred Starting Materials: Amines of formula (H2N)4ArYpZr (A) and acids of formula (XOC)2ArYpZr (B), in which
Ar = a (hetero)aromatic group;
Y = a single bond or a group with 1-20 carbon atoms;
p, r = 1-4;
Z = a group of formula -SO3H or -C(R1)(SO3H)2;
X = halogen or OR2;
R1, R2 = H or a 1-20C group
. Preferred compounds comprise:
(a) 3,3,4,4-tetra-amino-biphenyl, 2,3,5,6-tetra-amino-pyridine and/or 1,2,4,5-tetra-aminobenzene;
(b) (hetero)aromatic di-acids or their derivatives, e.g. phthalic, isophthalic, terephthalic acids and various substituted derivatives thereof, diphenic acid, naphthalenedicarboxylic acids, benzophenone-4,4-dicarboxylic acid, biphenyl-4,4-dicarboxylic acid, 4-carboxycinnamic acid etc. (35 di-acids listed);
(c) 2,3-diamino-5-**carboxyphenylsulfonic acid** and 2,3- or 3,4-diamino-6-**carboxyphenylsulfonic acid**;
(d) tri- or tetra-acids and their derivatives, especially e.g. trimesic, trimellitic, benzene-1 ,2,4,5-tetracarboxylic or naphthalene-1,2,4,5-tetracarboxylic acid etc. (14 acids listed), in amounts of 0-30 (preferably 0.5-10) mol% based on the amount of di-acid;
(e) heteroaromatic acids, preferably pyridine-2,5-, -3,5-, -2,6- or -2,4-dicarboxylic acid, similar derivatives of pyrazole, pyrimidine,

pyrazine or benzimidazole, pyridine-2,4,6-tricarboxylic acid, etc. (10 acids listed);
(f) diaminobenzoic acids and/or their mono- and di-hydrochlorides.
POLYMERS - Preferred Method: The solution prepared in step (A) may also contain dispersed and/or suspended polymer. Step (B) involves heating after forming a sheet of material as in (C). Step (D) involves treatment for 10 seconds to 300 hours at 0-150degreesC in presence of moisture, and the membrane obtained after (D) is crosslinked by the action of oxygen. A layer with a thickness of 20-4000 microns is formed in step (C) and the membrane formed in (D) has a thickness of 15-3000 microns. Electrodes made by this method have a conductive polymer coating with a thickness of 2-3000 microns.
FS CPI; EPI
MC CPI: A05-J02; A12-E06; L03-E04A2
EPI: X16-C01C; X16-E06A; X16-F02; X16-J01A

=> d 7-8 ibib abs ind

L45 ANSWER 7 OF 8 COMPENDEX COPYRIGHT 2008 EEI on STN
ACCESSION NUMBER: 2007(12):16296 COMPENDEX Full-text
TITLE: Synthesis and characterization of new strontium 4-carboxyphenylphosphonates.
AUTHOR: Zima, Vitezslav (Joint Laboratory of Solid State Chemistry the Institute of Macromolecular Chemistry Academy of Sciences, 532 10 Pardubice, Czech Republic); Svoboda, Jan; Benes, Ludvik; Melanova, Klara; Trchova, Miroslava; Dybal, Jiri
SOURCE: Journal of Solid State Chemistry v 180 n 3 March 2007 2007.p 929-939
SOURCE: Journal of Solid State Chemistry v 180 n 3 March 2007 2007.p 929-939
CODEN: JSSCBI ISSN: 0022-4596 E-ISSN: 1095-726X
PUBLICATION YEAR: 2007
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
LANGUAGE: English
AN 2007(12):16296 COMPENDEX Full-text
AB Several new strontium 4-carboxyphenylphosphonates, i.e., two modifications of Sr(HOOCC6H4PO3H)2, SrH(OOCC6H4 PO3)*H2O, Sr3(OOCC6H4PO3)2*4H 2O and Sr3(OOCC6H4PO3)2*5.7H2O were prepared and characterized by elemental analysis, thermogravimetry, X-ray powder diffraction and infrared spectroscopy. It was found that the compositions of these compounds depend on the acidity of the reaction medium. In addition, the presented compounds are interconvertible in dependence on pH. The position of the acid hydrogen atom in SrH(OOCC6H4PO3)*H2O was determined from the IR spectra of the studied compounds. The structure of the beta modification of Sr(HOOCC6H4PO3H) 2 was solved from its X-ray powder diffraction pattern using an ab initio method (the FOX program) with subsequent Rietveld refinement in the FULLPROF program. The compound is monoclinic, with the space group P21/c (No.14), a=49.88(2), b=7.867(2), c=5.602(3) A, beta=128.68(2)deg , and Z=4. It has a one-dimensional structure with an inorganic part built of SrO8 distorted tetragonal antiprisms. $CPY 2007 Elsevier Inc. All rights reserved. 31 Refs.
AN 2007(12):16296 COMPENDEX Full-text
CC 549.2 Alkaline Earth Metals; 801 Chemistry; 801.1 Chemistry (General); 802.2 Chemical Reactions; 931.3 Atomic and Molecular Physics; 941.4 Optical Variables Measurements
CT *Strontium; Reaction kinetics; Rietveld refinement; X ray powder diffraction; pH effects; Thermogravimetric analysis; Infrared

spectroscopy
ST Metal phosphonates; **Carboxyphenylphosphonic** acid; Inorganic organic hybrid compounds; Chain compounds; Layered compounds
ET C*H*O*P*Sr; Sr(HOOCC6H4PO3H); Sr cp; cp; H cp; O cp; C cp; P cp; C*H*O*Sr; SrH(OOCC6H; O*P; PO; H*O; H2O; Sr; H*O*P; H4PO; H; O; SrH(OOCC6H4PO; P; O*Sr; SrO

L45 ANSWER 8 OF 8 JAPIO (C) 2008 JPO on STN
ACCESSION NUMBER: 2005-220064 JAPIO Full-text
TITLE: **CARBOXYPHENYLPHOSPHONIC** ESTER COMPOUND AND METHOD FOR PRODUCING THE SAME
INVENTOR: SUZUKI HIDEO; KAWAMURA YASUO
PATENT ASSIGNEE(S): NISSAN CHEM IND LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2005220064	A	20050818	Heisei	C07F009-40

APPLICATION INFORMATION
STN FORMAT: JP 2004-28961 20040205
ORIGINAL: JP2004028961 Heisei
PRIORITY APPLN. INFO.: JP 2004-28961 20040205
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2005
AN 2005-220064 JAPIO Full-text
AB PROBLEM TO BE SOLVED: To provide **carboxyphenylphosphonic** ester compounds each useful as a monomer for flame-retardant and heat-resistant polymeric materials or as a raw material for other organic materials, and to provide respective methods for producing the compounds.
SOLUTION: These **carboxyphenylphosphonic** ester compounds are a **carboxyphenylphosphonic** dialkyl ester compound, a **carboxyphenylphosphonic** monoalkyl ester compound and an alkoxycarbonylphenylphosphonic monoalkyl ester compound, represented by formula[1], formula[2] and formula[3], respectively (in these formulae, R<SP>1</SP>, R<SP>2</SP> and R<SP>3</SP> are each a 1-20C alkyl; and (n) is an integer of 1 or 2). The respective methods for producing these compounds are also provided. COPYRIGHT: (C)2005,JPO&NCIPI
IC ICM C07F009-40
ICA C07B061-00

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=> d his nofile

     (FILE 'HOME' ENTERED AT 07:21:39 ON 23 FEB 2008)

     FILE 'HCAPLUS' ENTERED AT 07:21:53 ON 23 FEB 2008
L1            1 SEA ABB=ON  PLU=ON  US20060008690/PN

     FILE 'REGISTRY' ENTERED AT 07:22:26 ON 23 FEB 2008
               E  C7H8N2O5S/MF
L2           90 SEA ABB=ON  PLU=ON  C7H8N2O5S/MF
L3           88 SEA ABB=ON  PLU=ON  L2 AND 1/NR
L4            2 SEA ABB=ON  PLU=ON  L3 AND DIAMI?
               E CARBOXYPHENYLPHOSPHONIC ACID/CN
L5            1 SEA ABB=ON  PLU=ON  13598-36-2/RN
               E 2,3-DIAMINO-5-CARBOXYPHENYLPHOSPHONIC ACID/CN
               E  C7H8N2O5P/MF
L6            0 SEA ABB=ON  PLU=ON  DIAMINO?/CNS AND CARBOXYPHENYLPHOSPHONI
               C ACID?/CNS
L7            0 SEA ABB=ON  PLU=ON  DIAMINO?/CNS AND CARBOXYPHENYLPHOSPHONI
               C ACID?/CNS
L8            0 SEA ABB=ON  PLU=ON  DIAMINO?/CNS AND CARBOXYPHENYL
               PHOSPHONIC ACID?/CNS
L9            0 SEA ABB=ON  PLU=ON  DIAMINO?/CNS AND CARBOXYPHEN?/CNS
               PHOSPHONIC ACID?/CNS
L10           0 SEA ABB=ON  PLU=ON  CARBOXYPHENYLPHOSPHONIC?/CNS

     FILE 'HCAPLUS' ENTERED AT 07:29:56 ON 23 FEB 2008
L11          17 SEA ABB=ON  PLU=ON  CARBOXYPHENYLPHOSPHONIC?

     FILE 'REGISTRY' ENTERED AT 07:31:21 ON 23 FEB 2008
L12           1 SEA ABB=ON  PLU=ON  618-21-3/RN
               E C7H9N2O5P/MF
L13          18 SEA ABB=ON  PLU=ON  C7H9N2O5P/MF
L14           0 SEA ABB=ON  PLU=ON  L13 AND DIAMI?
L15           6 SEA ABB=ON  PLU=ON  PHOSPHONOBENZOIC ACID?/CNS
L16           0 SEA ABB=ON  PLU=ON  CARBOXYPHENYLSULFONIC ACID?/CNS
L17      103447 SEA ABB=ON  PLU=ON  BENZOIC ACID?/CNS AND SULFO?/CNS
L18         638 SEA ABB=ON  PLU=ON  L17 AND DIAMIN?/CNS
L19           2 SEA ABB=ON  PLU=ON  L18 AND 1/NR

     FILE 'HCAPLUS' ENTERED AT 07:37:08 ON 23 FEB 2008
L20          28 SEA ABB=ON  PLU=ON  L12

     FILE 'REGISTRY' ENTERED AT 07:37:34 ON 23 FEB 2008
L21           1 SEA ABB=ON  PLU=ON  L15 AND 1/NR

     FILE 'HCAPLUS' ENTERED AT 07:37:45 ON 23 FEB 2008
L22          28 SEA ABB=ON  PLU=ON  L21
L23          28 SEA ABB=ON  PLU=ON  L20 OR L22
L24           1 SEA ABB=ON  PLU=ON  L19 OR L4
L25           0 SEA ABB=ON  PLU=ON  CARBOXYPHENYLSULFONIC ACID?
L26           0 SEA ABB=ON  PLU=ON  CARBOXYPHENYLSULFONIC?
L27         577 SEA ABB=ON  PLU=ON  PHENYLENEDIAMINE?(3A)SULFO?
L28          71 SEA ABB=ON  PLU=ON  L27 AND CARBOXY?
L29          40 SEA ABB=ON  PLU=ON  PHENYLENEDIAMINE?(3A)SULFO?(L)CARBOXY?
L30           9 SEA ABB=ON  PLU=ON  PHENYLENEDIAMINE?(3A)SULFO?(5A)CARBOXY?
L31          43 SEA ABB=ON  PLU=ON  L23 OR L24 OR L30 OR L11
L32           2 SEA ABB=ON  PLU=ON  L31 AND (PROTON CONDUCT? OR ELECTROLYT?
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                )
L33           1 SEA ABB=ON  PLU=ON  L31 AND ELECTRO?/SC,SX
L34           3 SEA ABB=ON  PLU=ON  L32 OR L33
L35           4 SEA ABB=ON  PLU=ON  L24 OR L34

     FILE 'WPIX' ENTERED AT 08:12:05 ON 23 FEB 2008
L36           0 SEA ABB=ON  PLU=ON  PHOSPHONOBENZOIC ACID?
L37           1 SEA ABB=ON  PLU=ON  CARBOXYPHENYLPHOSPHONIC?
L38           1 SEA ABB=ON  PLU=ON  CARBOXYPHENYLSULFONIC ACID?
L39           2 SEA ABB=ON  PLU=ON  (L36 OR L37 OR L38)

     FILE 'COMPENDEX' ENTERED AT 08:14:10 ON 23 FEB 2008
L40           1 SEA ABB=ON  PLU=ON  CARBOXYPHENYLPHOSPHONIC?
L41           0 SEA ABB=ON  PLU=ON  CARBOXYPHENYLSULFONIC ACID?
L42           1 SEA ABB=ON  PLU=ON  L40 OR L41

     FILE 'PASCAL' ENTERED AT 08:15:00 ON 23 FEB 2008
L43           0 SEA ABB=ON  PLU=ON  L40 OR L41

     FILE 'JAPIO' ENTERED AT 08:15:22 ON 23 FEB 2008
L44           1 SEA ABB=ON  PLU=ON  L40 OR L41

     FILE 'HCAPLUS, WPIX, COMPENDEX, JAPIO' ENTERED AT 08:18:10 ON 23 FEB
     2008
L45           8 DUP REM L35 L39 L42 L43 L44 (0 DUPLICATES REMOVED)
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